UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,683	08/23/2001	David J. Vining	0101-P01789US1	3100

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EXAMINER
ROY, BAISAKHI

ART UNIT	PAPER NUMBER
3737	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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| Office Action Summary | Application No. 09/856,683 | Applicant(s) VINING ET AL. |
| | Examiner Baisakhi Roy | Art Unit 3737 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 December 2006</u>.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-15 and 23-110</u> is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1-15 and 23-110</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>2/2/07, 1/19/07, 1/18/07, 1/17/07</u>.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 08-06)   Office Action Summary   Part of Paper No./Mail Date 20070413

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 9-15, 30-44, 60-65, 68-108, and 110 are rejected under 35 U.S.C. 102(b) as

being anticipated by Cline et al. (4729098).

Cline et al. disclose a method and system including a computer implemented

method for interactively displaying three-dimensional structures comprising the

formation of a three-dimensional volume of data from a series of two-dimensional

images representing a physical property associated with a three dimensional body (col.

5 lines 1-4), segmenting a region of interest from the volume of data based on selected

values of the physical property representing the region of interest (col. 19 lines 33-38),

producing a wireframe model of the segmented region of interest, the wireframe model

comprising a plurality of vertices with each vertex having a coordinate position (col. 3

lines 15-59). Cline et al. also teach means for refining the wireframe model by adjusting

the coordinate positions of the vertices along a normal vector associated with each

vertex to more accurately represent the region of interest (col. 5 lines 24-28 lines 56-60,

col. 17 lines 10-34, claim 1). Cline et al. further teach rendering the wireframe model in

an interactive three-dimensional display, producing a virtual three-dimensional

environment (col. 4 lines 60-63).

The reference also teaches grouping or labeling the vertices of the wireframe

model into specific regions (col. 8 lines 20-48, col. 11 lines 33-68, col. 14 line 34 – col.

15 line 32). Cline et al. also teach analyzing specific abnormalities or defects (col. 19

lines 45-51) and rendering the wireframe model in an interactive three-dimensional

display to indicate the regions having abnormal structure. The eight bit vector is

employed to produce vector lists of approximating surfaces. A non-linear interpolation

operation is performed to more closely approximate the desired surface and to provide

more accurate representations of vectors normal to the desired surface and the

accurate representation of these normal directions provides mean for accurately

representing shading information on a display screen. The vertex grouper comprises a

curvature calculator for calculating a curvature at each of the vertices (col. 15 lines 33-

46).

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 6-8, 66, 67, and 109 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Cline et al. in view of Natarajan (5517602).

Cline et al. disclose a method and system including a computer implemented

method for interactively displaying three-dimensional structures comprising the

formation of a three-dimensional volume of data from a series of two-dimensional

images representing a physical property associated with a three dimensional body (col. 5 lines 1-4), segmenting a region of interest from the volume of data based on selected values of the physical property representing the region of interest (col. 19 lines 33-38), producing a wireframe model of the segmented region of interest, the wireframe model comprising a plurality of vertices with each vertex having a coordinate position (col. 3 lines 15-59). Cline et al. also teach means for refining the wireframe model by adjusting the coordinate positions of the vertices along a normal vector associated with each vertex to more accurately represent the region of interest (col. 5 lines 24-28 lines 56-60, col. 17 lines 10-34, claim 1). Cline et al. further teach rendering the wireframe model in an interactive three-dimensional display, producing a virtual three-dimensional environment (col. 4 lines 60-63).

The reference also teaches grouping or labeling the vertices of the wireframe model into specific regions (col. 8 lines 20-48, col. 11 lines 33-68, col. 14 line 34 – col. 15 line 32). Cline et al. also teach analyzing specific abnormalities or defects (col. 19 lines 45-51) and rendering the wireframe model in an interactive three-dimensional display to indicate the regions having abnormal structure. The eight bit vector is employed to produce vector lists of approximating surfaces. A non-linear interpolation operation is performed to more closely approximate the desired surface and to provide more accurate representations of vectors normal to the desired surface and the accurate representation of these normal directions provides mean for accurately representing shading information on a display screen. The vertex grouper comprises a

curvature calculator for calculating a curvature at each of the vertices (col. 15 lines 33-46).

Cline et al. however do not explicitly teach creating an isosurface of the segmented region of interest. In the same field of endeavor Natarajan discloses a method and apparatus providing topological displays of an internal characteristic of a physical object by creating an isosurface of the segmented region of interest (col. 8 lines 41-59). It would have therefore been obvious to one of ordinary skill in the art to use the teaching by Natarajan to modify the teaching by Cline et al. for the purpose of accurately determining the topology of the isosurface to maintain topological consistency between the isosurface and the polygonial approximation of the isosurface (col. 5 lines 23-30).

4.   Claims 23-29 and 45-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cline et al. in view of King, Jr. 5608849).

Cline et al. disclose a method and system including a computer implemented method for interactively displaying three-dimensional structures comprising the formation of a three-dimensional volume of data from a series of two-dimensional images representing a physical property associated with a three dimensional body (col. 5 lines 1-4), segmenting a region of interest from the volume of data based on selected values of the physical property representing the region of interest (col. 19 lines 33-38), producing a wireframe model of the segmented region of interest, the wireframe model comprising a plurality of vertices with each vertex having a coordinate position (col. 3 lines 15-59). Cline et al. also teach means for refining the wireframe model by adjusting

the coordinate positions of the vertices along a normal vector associated with each

vertex to more accurately represent the region of interest (col. 5 lines 24-28 lines 56-60,

col. 17 lines 10-34, claim 1). Cline et al. further teach rendering the wireframe model in

an interactive three-dimensional display, producing a virtual three-dimensional

environment (col. 4 lines 60-63).

The reference also teaches grouping or labeling the vertices of the wireframe

model into specific regions (col. 8 lines 20-48, col. 11 lines 33-68, col. 14 line 34 – col.

15 line 32). Cline et al. also teach analyzing specific abnormalities or defects (col. 19

lines 45-51) and rendering the wireframe model in an interactive three-dimensional

display to indicate the regions having abnormal structure. The eight bit vector is

employed to produce vector lists of approximating surfaces. A non-linear interpolation

operation is performed to more closely approximate the desired surface and to provide

more accurate representations of vectors normal to the desired surface and the

accurate representation of these normal directions provides mean for accurately

representing shading information on a display screen. The vertex grouper comprises a

curvature calculator for calculating a curvature at each of the vertices (col. 15 lines 33-

46).

Cline et al. however do not address said method to include guiding biopsy of a

tissue inserting a simulated biopsy needle within the lumen. In the same field of

endeavor King, Jr. discloses a method and apparatus for guiding the position and

orientation of image or a probe such as a biopsy needle in three-dimensional space

(col. 4 lines 23-25 lines 66-67), where three-dimensional display could be a wireframe

model (col. 5 lines 21-28). It would have therefore been obvious to one of ordinary skill in the art to use the teaching by King, Jr. to modify the teaching by Cline et al. for the purpose of accurately localizing the position of the needle in the spatial coordinate system as it is directed toward a lesion (col. 10 lines 5-9).
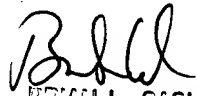
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Baisakhi Roy whose telephone number is 571-272-7139. The examiner can normally be reached on M-F (7:30 a.m. - 4p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BR

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